Amendments to the Drawings

- The scale of figure 1 and figure 2 were changed to show the mechanism without crowding.
- The characters, lines, numbers and letters were made uniform
- The characters were made legible.

Remarks

Careful consideration has been given to the official action of February 21 2007 and it is respectfully submitted that the amendatory action which has been taken places the application for allowance.

Drawings

The drawings were re-done to make them more legible.

Claims Objection

In the non-final rejection, the examiner stated that the claims by Low were anticipated by Struthers patent 6,481,973. These claims were amended to remove the objections.

Low's claim 2 now describes that a failure of the system is indicated when the pump is "on" and there is "no output flow" as indicted by detecting the presence of water at the output of the bilge system. This failure can be from dry running, a seized pump, a clogged pump or clogged input or output lines.

Low's claim 2: " Said apparatus of claim 1 wherein said system failure is indicated whenever said pump state is ON and said output flow has not been detected for a predetermined amount of time from the instant said pump state changed from OFF to ON indicating said system failure."

The Struthers patent is clearly different in that it does not have a water detection means at the output of the bilge system, but it rather determines a clogged system by measuring the torque of the motor. While this method of determining a clog may be relevant to the Struthers system, it is not relevant to the Low invention.

Low's claim 2 is no longer anticipated by Struthers as indicated by the rejection as follows:(col. 7:16-19,60-67)

Non final rejection of Low's claim 2	*Reason that this part of Struther's patent does not anticipate Low's invention.*
(Col. 7 16-19) "The controller checks at step 106 whether the pump has been run recently. In this embodiment, it checks whether it is more than 30 minutes since the pump has been run. If so, at step 108 the pump is run backwards."	In fact Struthers does not indicate a failure here but rather an algorithm of control.
(Col. 7 60-67) "If at step 124 the tank is not empty, the controller 22, 24 tests at step 126 whether the pump 54 is clogged. Where the liquid contains solids, such blockages may occur especially on startup. For example, the intake 58 or	This clearly states how a failure (clog) is detected and does not do so in a similar manner as Low.:

the outlet 60 of the pump 54 may be obstructed so that no liquid can flow, the pump impeller 62 may be clogged so that it rotates without effectively propelling the liquid, or the impeller or grinder may actually be jammed. The controller 22, 24 may detect blockages, for example, by detecting that the motor 12 is developing an unacceptably high torque.	

Struthers does indeed detect if the pump is clogged, however it detects the clog by measuring and assessing the torque produced by the motor and does not use a water detection means as the Low invention does. In fact the Struthers patent does not mention any type of flow or water detection sensor:

(col. 1: 60-61) "It is determined, by assessing the torque being generated by the motor, whether the pump is clogged."

(col. 3:30-32) "The inverter 30 is controlled by a microprocessor 24, which monitors the operation of the motor 12 by means of sensors 42 on the AC output from the inverter."

(col5:13:17) "By obtaining from the microprocessor 24 the power being drawn by the pump 54 and the speed of the pump, and from the known head pressure, the control board 22 verifies that the desired flow of liquid is being delivered.

(col. 6:50-53) "The pump unit 10 may also be equipped with various sensors, and the control board 22 may be arranged to monitor various fault states. The following are examples. A conventional overload circuit breaker (not shown) may be provided in the power supply, either within the unit 10 or externally; if the overload circuit breaker is within the pump unit, the control board 22 can monitor its activity, and discriminate that from other causes of loss of power. "

(col. 6:57-59) "Dry running of the pump can be identified by a power consumption too low for the pump speed. A power supply voltage too low or too high for the inverter 30 or the motor 12 can be measured directly. Failure of sensors may be detected if they give incredible readings. If liquid level sensors are used, a failure may be inferred if the liquid level in the tank 84 apparently fails to fall when the pump is active, or to rise when the pump is inactive.

(col.7:67 – col.8:2) "The controller 22, 24 may detect blockages, for example, by detecting that the motor 12 is developing an unacceptably high torque."

(col.9:66-67)" determining whether the pump is clogged by assessing the torque being generated by the motor;"

(col 10:5-6) "determining whether the pump is still clogged by assessing the torque being generated by the motor;"

The following Paragraph from Struthers mentions that monitoring is available for

multiple purposes; however, it mentions many monitoring chores not available in Low's invention and does not mention monitoring system failure:

Struthers (Col. 9:19-38)	Low
"The control board 22 may also be equipped and programmed to monitor and record operational statistics for monitoring and maintenance purposes. The statistics recorded preferably include: "	The Low invention only monitors flow by detecting water at the output of the system (yes or no). and the state of the pump (on or off). It uses simple logic to determine the condition of the pump system based on those 2 pieces of information.
minimum, average, and maximum values of the power consumption and motor temperature;	Not monitored by Low
the initial, average, and present values of the dielectric constant of the oil in the housing 14;	Not monitored by Low
and the average and maximum rates of flow of liquid into the tank 84.	Not monitored by Low
The influent flow rate figures may be used as a basis for charges for handling or processing the liquid.	Not monitored by Low
Other data monitored may include:	-
the number of operating cycles and the runtime over a current period and in total;	Not monitored by Low
the minimum, average, and maximum AC supply voltage;	Not monitored by Low
the minimum, average, and maximum operating current of the motor 12;	Not monitored by Low
the minimum, average, and maximum output head;	Not monitored by Low
the average and maximum discharge flow rate, and the total	Not monitored by Low

volume pumped;	
and the amount of vibration of the motor.	Not monitored by Low

Appendix